MASS. UM4.2: Sm18

Cooperative Extension Service, University of Massachusetts,
U.S. De[partment of Agriculture] and County Extension Services cooperating

UMASS/AMHERST
312066 0285 2895 0

L-269

SEP 9 1992

SMALL FAMILY FARM PRODUCTION FACT SHEET

Swine Production

Introduction to Hog Production

Management and marketing are the keys to successful hog production. Management is simply organizing available resources. The major goal of a hog producer is to organize nutrition, reproduction, waste control, and herd health into a production system that makes efficient use of land, housing, equipment, labor, and capital. The efficiency of this production system keeps costs down, but it is the marketing that brings the returns.

Hog production is divided into several phases: breeding, nursery, growing, and finishing. These phases reflect differences in the management and nutritional requirements of the hogs. Since raising hogs to a feeder pig size is a logical division, most hog production systems fall into one of the following three categories:

- Breeding and nursery phases – selling feeder pigs.
- Growing and finishing phases – finishing feeder pigs to market weight.
- Farrow to finish systems – combining both of the above phases.

Breeding Phase

The breeding phase includes maintaining sows, boars, and replacement gilts, and involves breeding, gestation, farrowing, lactation, and weaning. Newborn pigs are a part of this phase until they are weaned. The breeding phase requires a high degree of husbandry skill, with special emphasis on farrowing and caring for newborn pigs. There are periods of intense labor in the breeding phase, and swine diseases and piglet mortality are the primary risks of this phase. Since these risks continue into the nursery phase, the two phases are always integrated into one hog operation.

Nursery Phase

The nursery phase begins at weaning and continues until the animals have reached feeder pig size. Weaning size and feeder pig size vary with individual swine operations, but there are some basic guidelines. Small farm producers are not under the pressure to rebreed sows as quickly as large sow herd enterprises. Sows do not breed while nursing piglets, which is one of the major reasons for early weaning. However, early weaning requires careful management to maintain a low piglet mortality. Sow milk production generally peaks four to five weeks after farrowing. To take advantage of this milk production, piglets should be weaned after five weeks of age. By then they should weigh about 20 pounds, which will help them withstand the stresses of weaning. Many small producers do not wean until eight weeks of age by using an extended creep feeding program. This combines much of the nursery phase with the breeding operation, and at weaning the baby pigs will be consuming a fair amount of nursery-phase feed in addition to the sow's milk.

Animal Stress

Once the pigs are weaned, they are placed in a nursery. There they feed until they reach the size of feeder pigs, somewhere between 40 and 60 pounds. Small farmers who are going to sell feeder pigs need to take extra care to minimize animal stress at weaning and at shipping, two very stressful situations. Even if pigs are weaned late, they should be fed in a nursery for a minimum of a week before shipping. To maintain herd health and keep feed costs low, be sure to avoid the following stresses:

- Improper environmental temperatures
- Unsanitary and dusty housing
- Internal and external parasites
- Overcrowding and mixing of strange pigs
- Rapid change in diets
- Feeding unbalanced diets
- Lack of clean, fresh water

Herd Health

In cooperation with a veterinarian, the hog producer should establish a herd health program in an effort to prevent disease problems. The following is a list of some of the more common breeding and nursery phase diseases:

- Erysipelas (breeding herd and baby pigs)
- Leptospirosis (breeding herd)
- Brucellosis (breeding herd check)
- Atrophis Rhinitis (sows and baby pigs)
- Transmissible Gastroenteritis (sows for baby pigs)
- Mastitis, Metritis, Agalactia (sows)
- Enteric Colibacillosis (baby pigs)

Baby Pig Management

In addition to a health program, the following management practices are necessary for baby pigs between farrowing and the end of the nursery phase:

- Iron shots for anemia
- Clipping needle teeth
- Docking tails
- Castration
- Deworming

Nutrition

Much of the cost in raising pigs, particularly in the growing and finishing phases, is associated with the cost of feed. In breeding herds, non-lactating sows are generally limit-fed to keep their weight under control and to reduce the cost of feeding programs. Just before farrowing, feed is increased so that during lactation sows are on full feed. It is still recommended that lactating sows be hand-fed about a 16 percent crude protein diet. The quantity of feed is increased based on a sow's milkng ability and the number of suckling piglets.

Once baby pigs are weaned, they begin a series of phases in which the percentage of dietary protein required decreases. The protein portion of a ration is more expensive than the energy portion. As animals grow, their energy requirement increases relative to their protein requirement, so it is necessary to reformulate diets to keep feed costs down. This change in feed formulation is the basic difference between the growing and finishing phases. In large, swine producing operations, these phases are subdivided into even smaller steps of dietary changes. The following chart lists approximate feed requirements for pigs from weaning to market. The data are based on diets of primarily corn grain and soybean meal. The amounts will be different for alternative feeds.

	Phase		
	Nursery	Growing	Finishing
Body weight	20 - 40 lbs.	40 - 120 lbs.	120 - 140 lbs.
Crude protein in diet	19%	16%	14%
Daily consumption	2.0 lbs.	4.0 lbs.	6.5 lbs.
Daily gain	1.1 lbs.	1.4 lbs.	1.8 lbs.
Days on feed	18 days	53 days	67 days
Total feed	36 lbs.	208 lbs.	434 lbs.

Hog rations are a combination of an energy feed (usually corn grain), a protein supplement (usually soybean meal), and a vitamin-mineral premix (which contains salt, calcium, phosphorous, vitamins, and trace minerals). The vitamin-mineral premixes are usually formulated to be about three percent of the ration. There are also commercial hog protein supplements which contain the vitamin-mineral premix. These supplements are usually mixed with corn grain as the energy feed.

Alternative energy feeds are available, but more pounds of these will be needed to give the same weight gain as corn grain. The difference between energy feeds is a matter of their relative energy values. Before investing in an alternative energy feed, compare it to corn grain in terms of energy content to obtain an estimate of cost. For example, if corn costs $6.00 per hundred pounds, then wheat is worth about $5.85, sorghum $5.75, barley $5.55, and oats only about $5.00 with respect to their energy for feeding, growing, and finishing hogs.

Just as energy feeds are compared with corn grain, protein supplements should be compared with soybean meal. The actual protein requirements depend on the quality of the protein. Protein quality is most directly related to the proportion of amino acids in the diet. The common swine protein supplements are oil seed meals. When cereal grains are used as the energy feed, lysine is the limiting amino acid for determining dietary protein quality. If oil seed meals are compared in terms of lysine content, then soybean meal has the highest quality protein. For example, if soybean meal costs $15.00 per hundred pounds, then rapeseed meal is worth about $10.75, peanut meal $9.00, cottonseed meal $8.75, and sesame meal only $6.65 with respect to their protein quality for feeding, growing, and finishing hogs.

Parasites

For hogs to use feed efficiently, animal stress should be minimized. Internal and external parasites are a primary cause of stress in pigs. Internal parasites are controlled by worming with anthelmintics and then moving pigs to a clean area. Internal parasites are a problem in hogs of all ages. An effective worming program involves regular deworming of pigs in all phases, coordinated with proper sanitation and rotating the dewormed pigs to clean areas.

Hog lice and mange mites are the two most common external parasites. The hog lice are large (1/4-inch), blood-sucking parasites which most commonly cling to the neck and behind the ears. They are visible if you examine your hogs carefully. Mange mites are much smaller and generally burrow into the skin around the ears and over the head. The skin over them is slightly raised and will develop into brownish scabs which thicken into rough skin. This thickening is accompanied by intense itching, particularly in the summer. If a number of hogs are raised consecutively, it is advisable to include external parasite control in your management program. If only a few hogs are raised in an area which was not previously occupied by hogs, then careful observation and sanitation may be all that is necessary to control external parasites.

Marketing

While there are numerous marketing alternatives, most of them are not available to the small farmer because they are designed for marketing large quantities of uniform size and finished hogs. The primary markets available to the small farmer are auctions and direct sales.

Auction markets are a common, easy way to market both feeder pigs and market hogs. Auctions generally favor the producer, but there must be enough buyers attending to obtain competitive bidding. Another alternative for small farmers is direct marketing. Marketing finished hogs to individuals for a freezer trade is the most common example of direct marketing. While this type of marketing involves more work, the returns per hog are generally the highest. However, a producer cannot wait until the hogs are ready for market to establish direct marketing outlets. This is particularly true for the small farmer raising feeder pigs. You cannot wait until feeder pigs are ready to sell to find a finishing operating which will purchase your pigs. As your operation expands, you need to find your buyers in advance.

This fact sheet is a simple overview of swine production for the small farm system. Future fact sheets will cover more specific aspects of swine production. These will be published over the next few years by the Massachusetts Cooperative Extension Service.

Prepared by: Joseph P. Tritschler II, Ph.D., Livestock Extension Specialist, University of Massachusetts

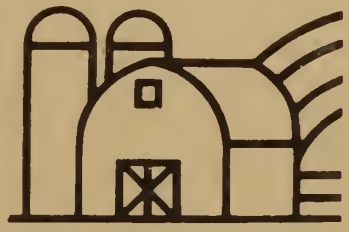
Issued by the Cooperative Extension Service, Daniel I. Padberg, Director, in furtherance of the Acts of May 8 and June 30, 1914; United States Department of Agriculture and County Extension Services cooperating. The Cooperative Extension Service offers equal opportunity in programs and employment. J1484:8/82-2500

COOPERATIVE EXTENSION L-410

University of Massachusetts,
U.S. Department of Agriculture and County Extension Services cooperating

SMALL FAMILY FARM PRODUCTION FACT SHEET

Raise Your Own Beef



Prepared by: W. A. Gross
Department of Animal Science
University of Rhode Island

If you have enough pasture, and zoning regulations allow you to do so, there are several advantages to raising your own beef. First, you have built-in quality control. If you like lean meat and have enough pasture, you can grow your beef on a grass-only diet. If you want meat comparable to USDA grade choice, you can fatten your animal on grain. Or you can select a finish anywhere between these two points, depending on your preference for the final product and how much you want to spend producing it. Monetary savings should not be your primary goal, as any purchased feeds will be at retail price and not the commercial producers' wholesale and slaughter costs. Total cost of such a project should be no more than store bought and may be less in many situations. Basically, grass feeding is the least expensive and heavy grain feeding is the most expensive.

When you raise your own beef, you also can determine how long you want the carcass to age — the longer it ages the more tender the meat will be, a convenience that is inefficient for mass production of today's supermarket beef. Whether you do it yourself, hire a custom slaughterer, or have a commercial slaughterhouse butcher your animal, you can also select the types and number of cuts you desire from the carcass. Do you want the maximum number of cuts to be roasts, steaks, hamburger, or a mixture of one or more, etc.?

There are also disadvantates to home beef production. Animals require daily attention with respect to feeding and watering. If the entire family will be away from home for a day or more, somone must be recruited (a prospective free steak?) or hired to provide this care. Also, if you or anyone in your family is sentimental, you run the risk of an unpleasant situation or guilt feelings when the time comes to slaughter your animal. Remember, your project is prospective meals, not a pet in the sense of a dog or cat.

Selecting the Animal

It is best to purchase a calf by weight instead of by a set price. Select a calf that weighs from 400 to 650 pounds. A lighter animal takes a longer time and more feed to raise. A larger animal costs you more to purchase and you may not be able to take advantage of all of your available pasture that helps make growing your own beef economical.

You should purchase a steer or a heifer. While bulls may give you the best growth for the amount of feed consumed and will produce a good quality lean meat if slaughtered at a young age, they can be hard to manage and may require better built facilities. Steers usually gain weight better than heifers, and there is no difference in the quality of meat produced. Breed is not too important. Any of the traditional beef breeds, a crossbred, or even a dairy breed with the exception of Jerseys and Guernseys will make a good animal for backyard beef production. Try to avoid buying calves that have extremely short, deep bodies or those that have very narrow, shallow bodies. These extreme body types tend to reduce the percentage of meat you will get from the carcass.

Calves are available almost year round depending on breed and type, however, you will probably want to purchase your animal in the spring to make the best use of your pasture. Livestock auctions or farmers are good sources to obtain a calf. The price you can expect to pay will vary, depending on size of the animal and the livestock market at the time you make your purchase. Normally heifers are less expensive than steers, five to seven cents a pound less when buying by weight. Calves will also be more expensive in the spring as opposed to the fall as there is more demand at this time by people who have pasture to be utilized, as opposed to fall stored feed or purchased feed feeding programs. If you have a readily available supply of inexpensive hay, you may want to hay feed during the winter to put 100 to 150 pounds of gain on the calf and finish off the calf on pasture in the spring.

Avoid purchasing a calf that moves slowly, has a dull or rough hair coat, drooping head, nasal discharge, or watering eyes. These are all signs of ill health. A healthy calf will be alert, eat well, and have a smooth, glossy hair coat.

Feeding Your Calf

As most feeding recommendations are based on the animal's weight, purchase a weigh tape to obtain approximate animal weights. This is a measuring tape that goes around the animal's body behind the shoulders (the girth) that converts inches to pounds. How much your animal gains depends on its inherited ability to gain and what you feed it. Daily gains average 2.5 to 3.5 pounds for an animal fed a high energy ration that contains a lot of grain. Daily gains for an animal fed only hay or strictly a grass pasture average 0.75 to 1.5

pounds depending on season and size of the animal. An animal on good pasture supplemented with some grain should gain 2 to 2.5 pounds a day. This is a 1/2 to 1 percent of body weight grain feeding program. The period you will have to feed your calf will range from less than 90 days to more than 200 days, depending on purchase and slaughter weights. The ideal slaughter weight is from 900 to 1,100 pounds for most steers and 850 to 950 pounds for heifers. Animals larger than this will probably carry excess fat.

Unless you choose to keep your calf in a pen and feed it a high energy purchased ration — the fastest but most expensive way to produce gains — you should have at least one acre of pasture available per animal for grazing. This is enough land to support one beef animal if you also feed some grain or hay. Less than one acre per animal is an exercise lot, and should not be counted on for much if any feeding value. Your pasture should provide anywhere from 90 to 120 days of good grazing depending on quality and quantity of forage. Two to four acres are required if you do not plan to do any supplemental feeding of any kind.

Even when your calf is on pasture, some supplemental feeding of a high energy ration is usually desirable before slaughter to improve the quality of the meat. Usually this period should be a minimum of 30 days. An animal finished on grass with no hay or grain will have a slightly different flavor and the fat will be yellow in color as opposed to the conventional white (a factor which does not affect quality).

There are two major categories of feed: concentrates (grains) and roughages (hay, silages). For an animal to grow normally or to gain weight efficiently, the amount that can be eaten in one day must contain enough energy and protein for body maintenance, growth, and weight gain. Normally, when a well-balanced ration is fed, only a trace mineral salt needs to be added. This can be done by placing a salt block in the pasture (not on the ground) or by providing salt in a pan or trough. The single most important element to any feeding program, however, is an ample supply of clean water. A 900 — 1,000 pound animal can consume upwards of 10 — 12 gallons of water a day, especially during hot weather.

When feeding a calf in dry lot (no pasture), the ration should contain both a concentrate and a roughage. A minimum level of roughage should be .8 pound per 100 pounds of body weight or 4-1/2 to 5 pounds of roughage for a 500 pound calf. Dry beet pulp, ground ear corn, or corn cob meal may be used as a roughage substitute on an equal weight basis and is less expensive than hay. Generally, a calf will eat from 2.5 to 3 percent of its body weight in feed daily. For top performance, about 70 to 80 percent of this feed should be a concentrate mix and the remainder a good quality roughage. A 600 pound calf will eat 15 to 18 total pounds of feed a day. Of this, 11 pounds should be concentrate mix and four pounds of hay for maximum gains in dry lot. This is feeding grain at about 2 to 2-1/2 percent of body weight and could possibly lead to digestive upsets or the animal going off feed. On good pasture the amount of concentrate mix fed can be reduced to 50 to 70 percent of the total feed intake or 1 to 1-1/2 percent grain per pound of body weight. Faster gains can be obtained by using more concentrates. One percent of body weight for grain feeding is a good economical value while providing an adequate or normal growth rate.

There are many commercial concentrate mixes available from local feed stores. Some are high in protein for use during the first part of the feeding period. Others are high in energy for use during the last part of the feeding period. You can also make up your own concentrate mixes if the ingredients are available at a reasonable price. In New England, feed transportation costs are high enough that normally there will be little if any cost advantage to mixing your own versus a commercially purchased concentrate mix. The most inexpensive ration will probably be a commercial dairy cow concentrate mix.

For normally growing steer or heifer weighing 500 pounds, a 14 percent protein ration would be fed up to 800 pounds live weight. When the animal reaches 800 pounds, the ration protein content could be dropped to 12 percent from then to slaughter weight.

For a similar weight animal, 500 pounds, being dry lot fed at a high grain level, an 18 percent protein ration dropping to 14 percent at 800 pounds should be adequate. If fed on pasture for real high gains, start with a 16 percent ration and then drop it to 14 percent. For a fall purchased calf, roughed through the winter on hay alone, feed a 12 percent ration when placed on pasture from then till slaughter.

Introduce your calf to concentrate feeds gradually. Feed approximately 1 to 1-1/2 pounds the first day. Gradually increase this amount every couple of days. If the calf quits eating or has very loose bowel movements, cut back on the concentrates.

There are some basic points you should remember when feeding your calf:

- Feed twice a day at regular times, establish a schedule, and keep it.
- Don't change feeds rapidly. If it is necessary to change grain or hay, mix some of the new feeds with the old and gradually increase the amount of new feeds used until the change is complete (2 to 3 weeks).
- Have fresh water and salt available at all times.
- Keep water and feeding troughs clean.

Again, the exact feeding program selected will depend on quantity and quality of the grass you have available, how long you want to keep the calf before slaughter, and the way you like your meat.

Slaughter

Unless you have the skills, equipment, and facilities, you will need someone to slaughter your animal for you. Some individuals will come to your place to do custom slaughtering or you can take your animal to a slaughter house. Check the classified ads of local newspapers or the yellow pages of your phone book for the availability of these services in your area.

References:

California leaflet 2930, *Raising Your Own Beef* — C. B. Wilson and Gary Beall.
Crampton and Harries, *Applied Animal Nutrition*, 2nd edition, W. H. Freeman and Company.

J2808:12/85-2500

COOPERATIVE EXTENSION L-411

University of Massachusetts,
U.S. Department of Agriculture and County Extension Services cooperating

SMALL FAMILY FARM PRODUCTION FACT SHEET

Preventing Swine Disease Problems

Swine disease is one of the major things a good hog producer fears. Without proper management and careful protection, swine herds are "sitting ducks" for disaster from disease outbreaks. The basic approach to the swine disease problem should be prevention of diseases, rather than reliance on treatment after pigs are infected.

A successful disease prevention program has two equally important phases — first, prevent disease; and second, control (and eliminate, if possible) disease problems already in the herd or on the farm.

HOW TO KEEP OUT SWINE DISEASES

1. **MAINTAIN A CLOSED HERD.** If you have a brood sow herd, keep purchases of outside stock to a minimum. All newly purchased pigs should be isolated for 30 days in an area at least 300 feet from your own pigs. Buy virgin boars. Bred gilt additions to the herd should be kept in isolation and farrowed in isolation away from the farrowing house. Never put a new herd addition into or near a farrowing unit where there are young pigs.

2. **RAISE YOUR OWN GILTS.** If this is not possible, purchase only healthy animals. If you are just starting out in the business, try to buy all your females from a single source.

3. **BUY VIRGIN BOARS.** Boar pigs purchased and brought onto your farm before they are of breeding age are free of breeding diseases. Older boars should be test mated to a few sows before you breed them to your entire herd.

4. **KEEP OUT DISEASE CARRIERS.** Provide disinfectant, a dairy brush, and a bucket so that visitors may disinfect their shoes, or keep a few pairs of boots for their use. Keep visitors from contact with baby pigs. Control stray dogs, cats, pigeons, and sparrows. Wage a constant campaign against rats. Keep livestock and feed trucks out of lots and off of ground to which pigs have access.

HOW TO ELIMINATE OR CONTROL THE DISEASE PROBLEMS YOU NOW HAVE

No hog farm is free from disease, but many of these problems can be overcome or at least managed to give a minimum of trouble.

1. **ELIMINATE SOURCES OF STRESS FOR YOUNG PIGS.** Maintain a comfortable environment for the sow and pigs. Sows like a temperature close to 55 degrees. The temperature in the brooders for pigs under 1 week old should be 85 to 90 degrees Fahrenheit. In wintertime, pigs will benefit from additional heat up to 8 weeks of age. Prevent overheating in summer by electric fan air movement, water sprayers, and shade. Stressors for young pigs include:

   1. Cold
   2. Dampness
   3. Drafts
   4. Dust
   5. Overheating
   6. Anemia
   7. External parasites
   8. Internal parasites
   9. Rapid feed change
   10. Lack of water
   11. Unbalanced ration
   12. Overcrowding
   13. Mixing strange pigs
   14. Noxious gases and strong odors
   15. Vaccination
   16. Castration
   17. Spoiled feed
   18. Low level disease infections

   Any one or any combinations of these stressors can operate to lower the resistance of pigs to disease-producing organisms already present. Bedding should be clean, dry, and free from dust. Ground corn cobs are excellent for this purpose.

   Be sure that baby pigs nurse as soon as possible after they are born. The mother's first milk (colostrum) gives the essential protection against infection.

Antibiotic treatment may be advisable soon after birth if scours becomes a problem. An antibiotic syrup and/or medicated starter could be used.

Prevent baby pig anemia. Use iron shots when pigs are 2 to 3 days old, and again at 18 to 21 days of age, or the new iron compound materials for feeding can also be used.

Keep groups of litters separated as much as possible. This becomes less important, from a disease standpoint, after pigs weigh at least 60 pounds.

Be alert for signs of disease and separate unhealthy pigs or sick litters from healthy pigs or healthy litters immediately. Separate the runts or "tailend" pigs from the good pigs at weaning time. Give them a few more weeks on pig starter.

Keep in close touch with your veterinarian. Request advice on how to manage your particular litters to prevent and control disease.

2. VACCINATE FOR PROTECTION AGAINST DISEASE. It is necessary to protect breeding herds of swine against erysipelas and leptospirosis. Feeder pigs should be vaccinated against erysipelas.

Hog cholera: The National Hog Cholera Eradication Program has successfully eliminated the need for vaccinating any swine against hog cholera.

Erysipelas: This disease is relatively common on hog farms. It usually appears at times of stress. Prevention is easy and inexpensive with a bacterin (killed-organism preparation) that stimulates immunity without introducting the erysipelas organism into the herd. Pigs should be at least 6 weeks old before they are vaccinated. Booster doses (for pigs on badly infested premises) may be administered at any time without danger.

Leptospirosis: This disease periodically produces severe abortion problems. Annual vaccination will prevent it in your herd. Leptospirosis bacterin can be administered anytime and, like erysipelas bacterin, is a killed-organism preparation that will not introduce infection into the herd.

Transmissible gastroenteritis (TGE):This highly contagious virus disease causes a rapidly fatal diarrhea in baby pigs up to about one month of age. If susceptible sows are exposed to the virus less than two weeks before farrowing, or baby pigs are exposed before three weeks of age, losses of baby pigs may reach 100 percent. The virus is believed to be carried from herd to herd by carrier animals, birds, visitors, and vehicles. Losses generally occur in early spring at about the time huge flocks of starlings, grackles, and blackbirds are returning from the south. After an outbreak the sows are immune and pass their immunity to the baby pigs via their colostrum for at least one year. A new vaccine recently developed appears to offer reasonable protection against TGE. See your veterinarian about its use in your herd.

Sow-to-baby pig immunity: It is important that brood sows be grouped together for at least a few weeks prior to their being put into the farrowing house. Breeding animals lotted or penned together develop resistance to disease-producing organisms common to the group. Immunity to these organisms or strains of organisms, if present, is passed on to the baby pigs through colostrum. A sow that did not run with the group may infect unprotected pigs of other sows in the farrowing house, and her own pigs may not receive the necessary protection.

Resistance of baby pigs to certain organisms (coliforms, salmonella) can be greatly reinforced if sows are given two doses of either a commercial bacterin or autogenous bacterin. These doses should be administered two weeks apart and the last dose given at least two weeks before farrowing. This is one good method of protecting baby pigs from infections arising from their farrowing house environment.

3. FOLLOW SOUND SANITATION. Sanitation means more than disinfection. It also involves providing an environment unfavorable for disease-producing organisms to multiply.

Steps:

* Keep out swine diseases as described earlier.
* Eliminate environmental stressors.
* Keep manure away from buildings.
* Locate buildings so that surface drainage is away from them.
* Rotate hog lots to prevent disease and parasite build-up in them.
* Clean and disinfect all buildings and equipment before any pigs under 60 pounds are moved into them.

Cleaning:

* The proper sequence is clean first, then disinfect.
* Remove all movable equipment.
* All equipment and all inside building surfaces must be cleaned of all traces of manure, bedding, dust, feed or other matter.
* First – Soak all surfaces with a hot detergent solution. Then spray with a high-pressure (400 to 500 pounds per square inch) water sprayer using a detergent solution or use a high-pressure steam spray. A cheaper method is to use a good hot detergent solution and a stiff broom and plenty of elbow grease.
* Then disinfect and fumigate.

a) Disinfectants

Following are some good disinfectants that can

be used in a swine enterprise: lye, sodium carbonate, sodium orthophenylphenate, and saponate solution of cresol are excellent, but they should be thoroughly rinsed off floors and equipment after several hours because they are poisonous or irritating to animals. Use sanitizers such as iodophor quaternary ammonium chloride or chlorine solutions for sanitizing troughs and other feeding equipment. Get rid of any strong disinfectant odors well ahead of the time that animals are put into buildings. Strong disinfectant odors are especially dangerous for newborn baby pigs.

Lye (sodium hydroxide) caustic soda. For general use one pound of lye to ten gallons of hot water is recommended. Lye contains about 94 percent sodium hydroxide, which is a very effective disinfectant. It will kill most germs and viruses. Concentrated lye is a caustic poison and care should be taken to avoid contact with skin or mucous membranes. It will not damage bare wood, earthenware, enamel ware, or any of the common metals, except aluminum. Lye solutions are most effective when used hot.

Sodium carbonate (soda ash, washing soda) is used chiefly as a cleaning agent but also has appreciable disinfecting value.

Sodium orthophenylphenate is a proven disinfectant with no objectionable odor. It is readily soluble in water and is not highly poisonous. The disinfectant should be used hot, most often in a 1 percent solution.

Quaternary ammonium chloride, iodophor, and chlorine compounds are useful for sanitizing water bowls and troughs but are not considered satisfactory for buildings. These dairy sanitizers are available at all farm supply stores.

Steam is an effective method of sanitizing buildings and equipment, especially when one of the recommended disinfectants is introduced into it. When used alone, steam is effective only when applied directly through a nozzle held not more than six to eight inches from the object being cleaned.

Fumigation is effective only for tight buildings. The least expensive and most commonly used fumigant is made from potassium permanganate and formalin. For each 100 cubic feet of room space, use one ounce of formalin (commercial 37 percent solution) and 17.5 gm. (0.6 oz.) of potassium permangante. Mix in an enameled or ceramic vessel. Keep building tightly closed for 24 hours. Avoid inhaling the gas. In long houses several fumigant generators may be more effective. Pour the formalin solution into the vessel containing potassium permanganate, then leave immediately. Start as far away from the doors as possible and then work toward the doors when placing fumigant generators.

Surfaces must be absolutely clean and wet before fumigation is started. It should be borne in mind that fumigation merely destroys airborne and surface bacteria and viruses. It cannot be counted upon for deep penetration. It is often used immediately following disinfection as an additional measure to destroy disease germs. Poultrymen have found fumigation to be absolutely necessary in order to control certain poultry diseases.

b) Rules for using disinfectants

(1) Disinfecting buildings or equipment that is not absolutely clean is a waste of time and money.
(2) Use disinfectants as directed by the manufacturer.
(3) Allow ample time for disinfectants to work.
(4) Cover all surfaces with a small amount of disinfectant spray. A small amount completely covering a surface will disinfect as well as a large amount.
(5) Fumigation following disinfection will assure a better job. Do not fumigate unless the building can be tightly closed.
(6) Allow buildings to air out thoroughly for at least a day to be sure no strong odors remain.
(7) Allow farrowing houses to remain closed and empty of livestock and feed for at least two weeks before new sows are housed for farrowing.
(8) Never allow runts or diseased animals to go back into a building that is clean and disinfected for housing new animals.

Rely on Your Veterinarian: Your veterinarian can help you recognize the weak points of your disease prevention efforts. He or she can help you develop a program for your herd that will virtually eliminate disease.

4. CONTROLLING EXTERNAL PARASITES

Hog lice are nearly 1/4 inch long — large enough to be seen easily with the naked eye. But they are often overlooked because of their slate blue color, which may resemble the skin of the hog. Lice are first noticed in small clumps inside the ears or in folds of skin about the neck. Another favorite location is on the inside surface of the legs near the body. These insects pierce the skin and suck blood, causing the skin to become thick, cracked, tender and sore. Injury is most severe during the winter.

Hog Mange — Common mange of hogs is caused by tiny mites which burrow through the skin, making thread-like tunnels up to one inch long. These mange mites, also called sarcoptes or itch mites, are too small to be seen reaily with the naked eye but are

visible through a hand lens or reading glass. They cause hogs to rub and scratch. The skin about the eyes, ears and along the top of the neck and back becomes scurfy, inflamed, scabby, and eventually raw and cracked. The bristles also become stiff and stand upright, giving the animals a round, unkempt appearance. Mange is highly contagious and may spread rapidly through a herd of hogs.

5. THE MOST COMMON INTERNAL PARASITE

Large roundworms, or ascarids, are the most common, most injurious worm parasites of swine. As a rule, young pigs are the victims of the heaviest infections. The clinical condition, known as ascariasis, is the result of injuries from both adult and larval worms. The adults normally live in the small intestine of their hosts. There is some risk, in heavy infections, of obstruction in the alimentary tract; many worms are less likely to cause obstruction than to bring about a condition characterized by poor utilization of feed, unsatisfactory gains, and digestive disturbances. The immature worms migrate extensively in the body, especially though the tissues of the lungs and liver, and cause damage, some of which is permanent. Pneumonia, "thumps," and scarring of the liver are frequent results. It is not known how frequently large roundworms cause death of pigs, but observations indicate that roundworms do adversely affect economic returns.

Taken from Special Circular 173, *Preventing Swine Disease Problems* by Dr. S. B. Guss, Extension Veterinarian, Pennsylvania State University.

Issued by the Cooperative Extension Service, E. Bruce MacDougall, Dean, in furtherance of the Acts of May 8 and June 30, 1914; University of Massachusetts, United States Department of Agriculture and Massachusetts counties cooperating. The Cooperative Extension Service offers equal opportunity in programs and employment. J2809:10/85-2500

University of Massachusetts,
U.S. Department of Agriculture and County Extension Services cooperating

SMALL FAMILY FARM PRODUCTION FACT SHEET

Producing High Quality Eggs in Small Flocks

by Louis Ruggles
Regional Poultry Specialist
Massachusetts Cooperative Extension

Eggs, prized for their proteins, vitamins and minerals, are a perishable food and must be handled properly to preserve their quality. Proper handling begins in the hen house and ends only when the eggs are consumed.

SELECTING GOOD STOCK – The first step in producing quality eggs is the selection of a strain of layers that has been developed for this purpose. Strains bred for egg production can be expected to produce substantially more eggs on much less feed than those bred primarily for meat production or exhibition. Breeders have emphasized certain characteristics in their stocks, such as egg size, shell color and interior quality. A variety of strains are readily available from Massachusetts hatcheries.

HOUSING AND EQUIPMENT – Layers require a clean, comfortable environment. The building should be designed to maintain a pen temperature ranging between 50 and 70° Fahrenheit except during extreme weather conditions. It must be ventilated to provide fresh air, eliminate odors and maintain a comfortable temperature. Windows should be placed to let in as much sun as possible.

Feeders and waterers should be located so they are easily accesible to the bird. Each layer requires 4 inches of feeder space. Provide one inch of water space per bird.

It is easier to produce eggs having clean shells when the litter is clean and dry. Sawdust, pine shavings, and sugar cane are commonly used for litter. The litter material should be spread 3 to 4 inches deep over the entire floor. Stirring or adding litter will help keep it dry in the winter.

Provide one single hole nest for every 5 layers. A 2 x 8 ft. community nest will care for 100 layers. The same kind of material selected for litter may be used in the nests. It must be replenished frequently to keep the eggs from breaking.

FEED AND WATER – Commercial feed manufacturers provide carefully formulated diets for layers. All of the nutrients, minerals and vitamins required to produce high quality eggs are contained in the feed. Specify a feed for laying hens. Clean, fresh feed should be available at all times. Avoid waste by filling the hoppers no more than half full. One hundred layers will consume from 25 to 30 pounds of feed daily, depending upon the strain of the bird and rate of egg production. Eggs contain 65% water. Have a supply of clean, fresh water available to hens at all times. Waterers should be cleaned daily.

LIGHTS – Hens need a minimum of 14 working hours to produce eggs efficiently. Starting in September it is necessary to add artificial light to the natural day length in order to maintain production through the winter months. A small bulb kept on all night long will prevent layers from molting during the fall and winter.

AGE OF BIRDS – Good laying breeds start laying at six months of age and should produce quality eggs for over one year. As the hen grows older, shells become weaker and interior quality tends to decline.

HANDLING EGGS PROPERLY

EGG COLLECTION – Eggs should be gathered frequently, preferably in wire baskets, and promptly cooled to maintain quality and minimize breakage and soiling. A good rule of thumb is to collect them two times daily.

COOLING – High temperature is egg quality's worst enemy. Eggs should be held in a cooler which operates at approximately 55° Fahrenheit and 70% relative humidity. Under refrigeration eggs will maintain Grade A quality for 3 to 4 weeks.

CLEANLINESS – Egg cleanliness begins with clean litter and nesting material. Soiled eggs should be cleaned as soon as possible. Slightly soiled eggs may be cleaned by lightly buffing them with steel wool or a sand abrasive. When washing is necessary, it is important to observe the following rules:

1. Use an approved detergent-sanitizer according to the manufacturer's directions.
2. The eggs should always be cooler than the temperature of the washing solution.
3. The temperature of the washing solution should be 100-110°F.
4. Keep the solution as clean as possible.
5. Do not rinse the eggs after they are washed.
6. Do not handle the eggs while they are wet.

GRADING AND SIZING EGGS – Eggs which are offered for sale must comply with Massachusetts regulations pertaining to quality and size. Quality grades are designated by the letters AA, A and B. Quality is determined by viewing the eggs before a light and is called candling. During this process the size of the air cell is evaluated and eggs with interior blemishes are removed. The older the egg, the larger the air cell. The depth of the air cells permitted is 1/8 inch for Grade AA; 3/16 inch for A and 3/8 inch for Grade B.

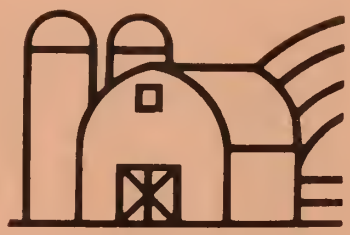
Egg size is measured in ounces per dozen. It is designated by the terms, Jumbo (30 oz. and up), Extra Large (27 to 30 oz.), Large (24 to 27 oz.), Medium (21 to 24 oz.), Small (18 to 21 oz.). Egg laws have been passed to assure that the consumer can purchase eggs of uniform quality and size. Eggs may be labeled and sold as "unsized and ungraded" but must be clean and whole.

Issued by the Cooperative Extension Service, E. Bruce MacDougall, Dean, in furtherance of the Acts of May 8 and June 30, 1914; University of Massachusetts, United States Department of Agriculture and Massachusetts counties cooperating. The Cooperative Extension Service offers equal opportunity in programs and employment. J2810:10/85-2500

University of Massachusetts,
U.S. Department of Agriculture and County Extension Services cooperating

SMALL FAMILY FARM PRODUCTION FACT SHEET

Duck Raising



by Louis Ruggles
Regional Poultry Specialist
Massachusetts Cooperative Extension

Ducks can be raised to add variety of both meat and eggs for the table. Breeds of ducks which are good, marketable, table quality, and also fair egg producers, are best suited for use on general farms and may be kept wherever good pasture land with running water is available. Ducks, in general, require less intensive management, stand confinement well, and are less subject to disease than chickens.

Ducks are generally considered as meat birds and not for egg laying capabilities. The breeds generally used for meat purposes are: (1) Pekin, (2) Muscovy and (3) Rouen. The breed kept for egg production is the Runner, commonly called the Indian Runner.

The Pekin duck is the most important of all the different breeds and is the one kept by most people for meat. The Pekin is usually marketed around 9—11 weeks of age when they weigh 5—8 pounds apiece. A duck of this breed has a creamy-white plumage, a long, broad, and deep body, with a full breast and deep keel (the part extending backward from the breast). The color of the skin is yellow, the shanks and toes should be reddish-orange, and the bill, orange yellow, free from black. Standard weights of the adult drake and duck are approximately 9 and 8 pounds, respectively. Pekins combine utility and beauty to a high degree, and usually are very uniform in size. They are hardy, fair layers, practically non-sitters, and are especially adapted for the production of meat. They are timid and easily frightened, very docile, easily confined by low fences, and well adapted for either commercial duck farming or as a side issue on general farms.

The Muscovy has two standard varieties, the white and the dark. The head and face of the Muscovy are partly bare, with red, rough, carunculated skin. It has a long, broad body, with greater breadth but less depth and less keel development than the Pekin. The drake should be at least one-third larger than the duck, as the standard weight of the adult drake is approximately ten pounds and that of the duck, seven pounds. The white variety has pure white plumage, pale orange or yellow legs, and a pinkish, flesh-colored beak. The breast, body, and back of the dark Muscovy are a lustrous blue-black, broken with some white. The wing coverts are also a lustrous blue-black with splashes of white, and the tail is black. The bill is pink shaded with horn, and legs may be yellow or a dark leaden color. These ducks are not a good commercial product because of the difference in male and female size. Moreover, they are good flyers and can readily fly over ordinary poultry fences. However, this breed is a wide forager, requires very little care, is not as noisy as the Pekin, and can be kept with fair success on general farms.

GENERAL INFORMATION

INCUBATION — Twenty-eight days is the period of incubation for duck eggs other than those of the Muscovy breed which require 33 to 35 days. The eggs may be hatched either naturally or artificially. Good, fertile eggs must be used and can be obtained only from stock that is properly mated and kept under the best possible conditions for health and vigor.

Pekin and Runner ducks rarely sit; consequently, unless an incubator is used, the eggs are usually hatched under hens or in commercial incubators. Incubator temperatures should be 102.5°F for the first week, 103°F to 103.5°F from then until hatching occurs. Ducklings usually take 24 to 48 hours to hatch after they "pip" or crack their shells. Duck eggs require higher humidity than chicken eggs in the incubator and may be sprinkled with warm water during the hatching period. Great care should be used in taking ducklings from incubator to brooder house to see that they don't get chilled or that their legs don't get injured. Ducklings need not be fed for 24 to 36 hours after hatching.

BROODING — After ducklings hatch, remove them to a heated pen, allowing 1/2 to one square foot per duckling for first week while providing room for them to move away from the source of heat. Keep the temperature 90° to 95° under the brooder hover for the first week, them reduce the heat 5 degrees each week until 6 weeks of age when they will no longer require heat. If using a hen to hatch duck eggs, be sure to contain the hen after ducks hatch or she may lead ducklings too far and therefore subject them to chilling. Outside runs can

be used, depending on time of year, after the ducklings are two weeks old.

Brooder houses should be insulated, well ventilated, have dry litter (straw, sawdust, or several), have plenty of water and feeder space. Outside runs should be on well-drained, sandy soil, and if convenient, have access to water. Ducks need large amounts of clean, fresh water for good growth.

Brooder house floor space requirements for ducklings are as follows:

0–1 week of age: 1/2 sq. ft. per duckling
0–2 weeks of age: 3/4 sq. ft. per duckling
2–3 weeks of age: 1 sq. ft. per duckling
3–4 weeks of age: 1-1/4 sq. ft. per duckling
4–5 weeks of age: 1-1/2 sq. ft. per duckling
5–6 weeks of age: 1-3/4 sq. ft. per duckling

In specific farm conditions there are a number of factors which enter into the question of how many ducklings per sqare foot: (1) Time of year, (2) Ample feeder space, (3) Ample water supply, (4) Ample air circulation, (5) Sanitation of pens, and (6) Access to good runs. The degree to which each of the above is supplied will influence the number of ducklings that can be handled per square foot of pen space. A lack of any of the above constitutes crowding.

FEEDING PROGRAMS

Ducks should be fed a commercially prepared Duck Pellet. If this is not available, an unmedicated poultry growing pellet may be used. Feeders should be distributed around pens and be plentiful enough so that all can eat at the same time. Fresh, clean water should be available and plentiful enough for all ducks to drink at once.

Ducklings can be fed pellets from one day old until time of marketing. Ducks make good use of green forage and this also helps reduce feed costs.

HOUSING

Most any type of housing will suffice for older ducks as long as it is well ventilated, well lighted, contains dry litter, and is relatively windproof. An old shed, under the barn, or part of the garage to house older ducks in times of snow storms or driving rains will be all that is needed.

DISEASES AND PREDATORS

Cats, dogs, foxes, skunks, rats, raccoons and snapping turtles can be bad medicine to ducklings or ducks, and protection with good fences should be practiced.

Duck Cholera and Baby Duck Virus Hepatitis are about the only diseases one has to contend with. **If you suspect any trouble, usually resulting in dead ducks, call the poultry diagnostician at the Suburban Field Station in Waltham. Telephone: 617/891-0650 for diagnosis and recommendations on treatment.** Farmyard ducks or small flocks very seldom if ever are troubled with disease problems.

MARKETING

Ducks, unless kept for pets, should not be kept after they reach marketable age (usually 9–11 weeks of age). After growth stops, it takes very little time for them to "eat their heads off" or eat a lot of feed which returns you no profit. One of the secrets of successful duck management is to time the hatches so that maximum growth will be reached in minimum time from date of hatching, and be in step with market demand for ducks.

Issued by the Cooperative Extension Service, E. Bruce MacDougall, Dean, in furtherance of the Acts of May 8 and June 30, 1914; United States Department of Agriculture and Massachusetts counties cooperating. The Cooperative Extension Service offers equal opportunity in programs and employment. J2811:10/85-2500

COOPERATIVE EXTENSION L-414

University of Massachusetts,
U.S. Department of Agriculture and County Extension Services cooperating

SMALL FAMILY FARM PRODUCTION FACT SHEET

Growing Turkeys in Small Flocks

GROWING TURKEYS IN SMALL FLOCKS

by Louis Ruggles
Regional Poultry Specialist
Massachusetts Cooperative Extension

Growing a small flock of turkeys can be an enjoyable family project as well as provide some holiday meals. It also has the advantage of ending before cold weather requires elaborate housing.

Growing a few turkeys requires little labor other than during the marketing season. As a small flock enterprise, it can be scheduled for the 20 to 24 week period from late May to November. Hens stop making effective gains at 20 weeks, toms at 24 weeks. Turkeys are brooded and raised much the same as chickens. They do utilize more space, consume considerably more feed, and require careful watching when they are young.

PURCHASING POULTS — It is essential to purchase high quality poults from a reliable source. The Extension Service or the Massachusetts Department of Food and Agriculture can furnish a list of hatcheries from which poults may be purchased.

HOUSING — For the small flock, the same housing can be used for brooding and growing. A small shed or brooder house will provide satisfactory shelter. Since the poults will be confined to the house for the first several weeks, the building should be large enough to allow 1-1/2 square feet of floor space per bird. A 10 foot by 12 foot structure will be adequate for brooding 75 poults to six weeks of age.

Although not essential, a porch attached to the building may serve as an exercise yard. The combined floor area of the porch and shelter should total approximately 5 square feet for each turkey. The porch floor is constructed of wooden slats 2 inches to 3 inches wide, spaced 1-1/4 inches apart. It should be high enough off the ground to facilitate manure removal and be completely enclosed by wire netting to contain the turkeys. After 8 weeks of age turkeys may be ranged on well-drained areas. A simple shelter to provide protection from the sun and rain is desired.

BROODING — Although poults may be started in electric battery brooders, it is probably more practical to brood them on the floor. Prior to their arrival, the entire floor of the brooder house should be covered to a depth of 3 to 4 inches with clean shavings or a commercially available litter material. The use of straw for litter is not advised, since the poults may eat it. Do not cover the litter with paper because the poults will find it slippery to stand on.

Infrared lamps are convenient to use as a source of heat. A single 250 watt lamp will care for about 25 poults. Suspend the lamp so that no surface of it is closer than 18 inches to the litter. Multiple lamp units equipped with thermostatic controls can be purchased for brooding larger numbers of poults. Heat should be turned on and the temperature adjusted at least a full day before the poults arrive.

The optimum temperature for day-old poults is 95°F at back height directly under the hover. Temperature should be reduced at 5 degrees each week. If lamps are used, raising the lamp one inch each week will accomplish this. Poults hatched in May or June seldom require artificial heat after the sixth week.

A cardboard strip or wire netting 12 to 18 inches high and long enough to encircle the hover approximately 30 inches from the heat source will keep poults near the heat and out of corners and provide room for them to be comfortable. Comfortable poults will distribute themselves freely and evenly beneath the hover. If they are cold, they will crowd together. If they are too warm, they will move as far away from the heat as possible. Uncomfortable poults will chirp loudly.

Keep all containers such as buckets, water fountains and tube type feeders closed to prevent the poults from piling into them. It is also suggested that the corners of the brooder house be blocked off for a few weeks after removing the brooder guard.

FEEDING – Follow the feeding program recommended by your local feed dealer. Turkey diets contain more protein and are, therefore, more expensive than chicken rations. Remember that feed consumption will increase as the turkeys grow. Discuss with your feed dealer the quantity of feed required and the frequency of purchasing it.

Turkeys should have fresh feed before them at all times. Have the feeders full when the poults arrive and, in addition, spread some feed on paper plates or clean egg flats. These can be removed after two or three days. Be sure the pen is well lighted so the poults can find the feed. Allow 2 inches of feeder space per poult up to 4 weeks of age. After 4 weeks, use larger feeders and increase the space to 5 inches per bird.

WATER – Provide at least two 1 gallon waterers for each 100 poults. From 8 weeks to market age, each turkey should have at least 1 inch of waterer space. Keep the water supply fresh and wash the waterers frequently.

Even in a well-lighted brooder house the poults may have difficulty in first finding water and feed. An old practice which can still be used in small flocks is to dip each poult's beak into the water and then into the feed.

Issued by the Cooperative Extension Service, E. Bruce MacDougall, Dean, in furtherance of the Acts of May 8 and June 30, 1914; University of Massachusetts, United States Department of Agriculture and Massachusetts counties cooperating. The Cooperative Extension Service offers equal opportunity in programs and employment. J2812:10/85-2500

HEALTH – The best insurance against disease is to start the poults in clean surroundings and follow good sanitation practices throughout the brooding and growing periods. Weekly manure removal from beneath the porch will help avoid objectionable fly and odor problems.

Droopiness, off-feed, high mortality, sneezing, and diarrhea are typical symptoms of a health problem. Very sick birds should be removed from the flock and destroyed. Medication in the feed should be used according to the manufacturer's directions. **A poultry diagnostician is available at the Suburban Field Station in Waltham, Massachusetts. Telephone: 617/ 891-0650.**

Practical Production Standards

	Hens	Toms
Age at Slaughter	18 weeks	22 weeks
Total Feed Consumed	60 lbs.	80 lbs.
Average Live Weight	16 lbs.	27 lbs.
Shrink from Live Weight to Oven Ready Weight	20%	25%
Flock Mortality to Slaughter Age	10%	10%

University of Massachusetts,
U.S. Department of Agriculture and County Extension Services cooperating

SMALL FAMILY FARM PRODUCTION FACT SHEET

Brooding and Rearing Chicks for Family Flocks

Start With Quality Chicks

1. Buy chicks from a reliable hatchery. There are some advantages to buying from a local source if it can provide quality chicks, information, and service to its customers.
2. Buy the strain or type of chicks to fit your needs. If you are interested only in egg production, order sexed pullets of Leghorn or egg-type strains. If you are interested in meat, order one of the popular broiler crosses or white Plymouth rocks. You can get dual-purpose strains if you are interested in both eggs and meat.

Brooder Floor Space

Normal brooding period when heat is required is about 6 – 8 weeks. There are many places on the farm where chicks may be brooded. The main requirements are: (1) adequate space, (2) reliable source of heat (brooder), and (3) proper ventilation. The following space is recommended:

Age of Chicks	Floor Space/Bird
0 – 4 weeks	1/2 sq. ft.
4 – 8 weeks	1 sq. ft.
8 – 12 weeks	2 sq. ft.
12 weeks or longer	2-1/2 – 3 sq. ft. (light breeds) 3 – 3-1/2 sq. ft. (heavy breeds)

Example: A 10' x 12' brooder house will take care of 120 chicks to 8 weeks of age.

Brooders

The most popular brooders are infrared lamps, and propane catalytic and gas brooders. Your choice among these should depend on convenience, installation cost, and operating costs.

The infrared heat lamp (pyres-type) is ideal for brooding small litters of 200 or fewer chicks. Make certain the lamp is equipped with a porcelain socket, lamp guard, and at least No. 16 heavy insulation wire. Provide one 250-watt lamp for each 50 to 75 chicks.

Gas brooders are very reliable and are economical if gas is used elsewhere on the farm and is purchased in sizable volume. The main advantage of the catalytic brooder is that it is flameless and almost 100 percent efficient.

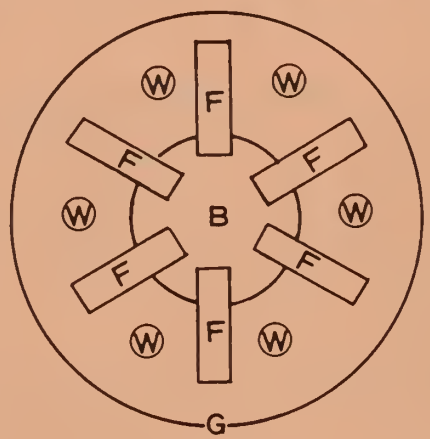


Figure 1: Brooder Arrangement

B – Brooder stove with hover
F – Feeders arranged in spoke-like fashion
W – Waterers (quart size)
G – Chick guard 18 inches high arranged in 4 – 6 foot diameter circle around brooder

Feeder Space

The amount of feeder space recommended per 100 chicks is:

Age of Chicks	Feeder Space
0 – 4 weeks	12 linear ft. or two 3- ft. feeders
4 – 8 weeks	20 linear ft. or two 5- ft. feeders
8 – 12 weeks	30 linear ft. or three 5-ft. feeders
12 weeks and older	40 linear ft. or four 5-ft. feeders

Waterer Space

The amount of waterer space recommended per 100 chicks is:

Age of Chicks	Waterer Space
0 – 1 week	Six 1-qt. jar waterers
1 – 4 weeks	Two 2-gal. waterers
4 – 12 weeks	Two 5-gal. waterers

Automatic waterers may be used after the first week.

Before Chicks Arrive

1. Remove old litter. Clean and disinfect the ceiling, walls, and floors of the poultry house. Let the house dry thoroughly before putting down new litter. Clean and disinfect all equipment, including feeders, waterers, and brooders.
2. Repair windows, doors, ventilators, or any part of the brooder house which needs attention. Eliminate drafts.
3. Cover the floor with 3 to 4 inches of dry litter. Use shavings, sawdust, or other material that is readily available, economical, and has good moisture absorbency.
4. Use a chick guard (circular fence about 18 inches high) to confine birds near the brooder. (See Figure 1.) Some people cover the litter for first few days of brooding. If you do this, use rough, crinkled paper. Smooth paper causes chicks to slip and develop spraddled legs. Molds will develop if paper is left on the litter more than three to four days. Remove guard after seven days.
5. Check all equipment to see that it is working properly. Operate brooder stoves for at least 24 hours before the chicks arrive. This will warm and dry the house and demonstrate to you the accuracy of brooder controls and thermostats.
6. Put out feed and fill the waterers a few hours before the chicks arrive. When chicks arrive be ready for them.

MANAGEMENT OF CHICKS

After Chicks Arrive

1. Adjust brooder stove to 90 – 95°F, measured 2 inches above the litter at edge of hover. Maintain this temperature for the first week. Reduce temperature five degrees each week until 70°F is reached.
2. Watch chicks closely for the first few days and nights to see that they are comfortable. They will crowd under the hover if they are too cold, and away from the hover if they are too warm. Give chicks room enough to adjust to their preferred temperature.
3. If infrared lamps are used, raise the lamps when chicks appear to be too warm. Normally, lamps should be set 18 inches high the first week and should be raised 1 inch per week.
4. Provide plenty of fresh air for chicks. Do not close house tightly to keep it warm. Chicks need fresh air, and air is used to carry moisture out of the house. The floor will be dryer and the chicks healthier when proper ventilation is provided.
5. Keep litter dry. This is important to prevent coccidiosis and other diseases. Frequent stirring of the litter helps keep it dry. Adding some hydrated lime to the litter will also help keep it dry.

Light

A 15-watt bulb for each 200 square feet of floor area should be kept on at night for the first week. Thereafter, the lighting system to use depends on the type of building. Any system that provides a maximum of 14 hours total light per day during the entire brooding and growing period should give satisfactory results.

Roost

Roosts are not used for broilers. Roosts can be used for layer replacement chicks if desired. Install low roosts when chicks are four to six weeks of age to provide each chick with 4 inches of roost space. Layers will need 6" spacing on the roost.

Feed and Water Management

Keep feed and water before chicks at all times. Clean waterers frequently and place them on slatted or wire platforms so birds will be kept away from wet floor areas. Prevent feed wastage by filling feeders only one-third to one-half full.

Feeding

For the first six weeks feed a 20 percent protein starter mash; then change to an all mash that is a 16 percent protein grower mash, to 20 weeks.

A coccidiostat (a drug used to control the disease, coccidiosis) should be used in the ration continuously throughout the growing period. You will need about 3 lbs. of feed for the first 6 weeks then change to grower mash after 20 weeks.

Cannibalism

Anytime birds are confined they are subject to cannibalism. If possible, buy chicks that have been debeaked at the hatchery. Watch for early signs of feather picking, and debeak the birds before cannibalism becomes an established habit. Clip off tip of the beak with a dog's toe nail clipper or an electric debeaking machine.

Protecting the Flock

Young chicks and growing birds should be protected and isolated from other animals and birds. Cats, rodents, and numerous wild animals will kill young chickens. These animals can also spread diseases and parasites. Rodents can contaminate and consume large amounts of poultry feed while being destructive to the building.

Reprinted courtesy of United States Department of Agriculture (Agricultural Fact Sheet 3-6-1).

Issued by the Cooperative Extension Service, E. Bruce MacDougall, Dean, in furtherance of the Acts of May 8 and June 30, 1914; University of Massachustts, United States Department of Agriculture and Massachusetts counties cooperating. The Cooperative Extension Service offers equal opportunity in programs and employment. J2813:10/85-2500

COOPERATIVE EXTENSION L-416

University of Massachusetts,
U.S. Department of Agriculture and County Extension Services cooperating

SMALL FAMILY FARM PRODUCTION FACT SHEET

Keeping the Newborn Lamb Alive

Management of newborn lambs is particularly important since this is when the greatest death loss occurs. Over one-half of the deaths of lambs from birth to weaning occur in the first five days after birth and almost three-fourths of these losses occur in the first three days About one-half of these losses are due to respiratory diseases such as pneumonia, or starvation and scours. Frequently a majority of these diseases can be prevented by timely management during the critical period. Some of the recommended practices to follow are:

I. Be sure the newborn lamb starts breathing.
   A. Remove membranes and mucous from its nose.
   B. A sudden shock will often start breathing.
      1. A slap on its rib cage.
      2. Dropping lamb onto the bedding.
      3. Blowing into its mouth.

      If the lamb is filled with mucous, hold the lamb by its rear legs and massage the rib cage. It may help to use a syringe to remove mucous from the nasal passages. Artificial respiration may be of help in some cases.

II. Be sure the ewe owns and mothers the new lamb.
   A. As soon as the lamb is breathing, put it up by its mother's head and encourage her to clean it off. If she doesn't offer to clean it after a few minutes, it is advisable to dry it manually with a clean rag or towel.
   B. If she lambs in a pen with other sheep, be sure to put a hurdle around the ewe and lamb. This is especially important with first lambers.
   C. After she has gotten to her feet and is mothering the lamb, it's time to move her to a lambing pen. Grab the lamb by the loin or under the chest and back, slowly keeping the lamb under the ewe's nose until you get to a lambing pen. Don't let the ewe get away and run off.
   D. Check the ewe's udder and start the flow of milk by stripping. The ewe should have been tagged; if not, it should be done at this time. After the lamb has dried off, be sure it nurses. In most cases, the lamb will take care of itself, but if you're not sure, help the lamb get started. This will take a lot of patience and perserverance.

      It may help to:
      1. Put some milk on the end of the teat.
      2. Strip some milk into the lamb's mouth.
      3. Tickle the lamb under the tail when the teat is in its mouth.

      If the lamb postively won't nurse:

      Strip some colostrum into a jar and force-feed with a syringe and rubber adaptor. After a few swallows the lamb will usually begin to suck. If possible, feed the lamb by the ewe's rear flank, and as soon as it begins to suck, switch it over onto the ewe.

Troubles And What Can Be Done

I. A Chilled Lamb.
   A. Immerse the lamb in a bucket of warm water 90 to 100 degrees for 10 to 15 minutes.
   B. Dry with a clean towel, and rub vigorously.
   C. Put the lamb under a heat lamp in a draft-free place.
   D. When the lamb is dry, feed it two to three ounces of colostrum milk.

      If the lamb has been put into water, be careful when you put it back with the ewe, for she may disown it because you have washed away all the odor.

II. No Milk!
   A. Keep on hand five to six pints of frozen colostrum (cow's, goat's, or ewe's).
   B. Give at least three feedings of colostrum. Then mix the colostrum with cow's milk for five feedings. Then put the lamb on straight cow's milk.
   C. Starvation from low milk yield or no milk at all is one of the major causes of baby lamb mortality. If a ewe has no milk, it's essential that newborn lambs receive colotrum, so you should make provisions to have some on hand for emergencies. It may be obtained from heavy milking ewes, goats or cows, and then frozen until required. It's recommended that colostrum be provided for the

first three feedings (three or four ounces per feeding) which can be spaced at three hour intervals. After this, colostrum can be mixed with cow's milk for the next five feedings. Then put the lamb on straight cow's milk. If not available, canned or evaporated milk can be used.

Recent studies conducted at Ohio State University indicate that baby lambs will perform satisfactorily on milk replacers. Lambs used in one trial were chosen from artificial rearing on the following basis: lambs from ewes with insufficient milk supply, orphan lambs resulting from poor ownership or death of mother, and lambs that were extremely small and/or too weak at birth. Twelve lambs were fed a milk replacer from an insulated feeding vat which had a series of nipples. The milk replacer was cold (36 degrees) because experience has shown that lambs will have fewer digestive disorders and more satisfactory performance. (It may be necessary to provide warm milk initially.) It was also found that the average time to start young lambs on artificial milk is 30 minutes, and that each lamb requires an average of 7.1 nursing assists and two days before being considered self-sufficient.

Commercial lamb milk replacers are available in this area. Veal calf replacers have been used for lambs, and these are available at most feed outlets. The replacer should contain a minimum of 20% fat and 20% protein and should be diluted with water (1 part replacer and 4 parts water). It's suggested that the feeding utensil, mixing equipment and nipples be thoroughly cleaned daily.

D. Look for a ewe that you can graft the lamb onto or a young neighbor who wants to bottle feed a lamb.

III. Ewe refuses to own lamb.

A. Restrain ewe so that she is unable to injure the lamb.

B. Tranquilize.

C. Give the ewe something to worry about, such as a dog hitched within view. This will distract her.

D. Be sure to keep the ewe in a lambing pen until you're absolutely certain she owns the lamb.

IV. Weak Lamb.

A. Be sure it get colostrum as soon as possible.

B. Dextrose under skin (S.C.) or in body cavity (I.P.).

C. Provide plenty of heat.

D. Stimulants, injected (adrenalin) or orally (tea, coffee, whisky, or brandy).

V. Other Trouble Spots.

A. Abnormally large teats. Keep stripped out and assist the lamb to nurse three to four times daily.

B. Large pendulous udders. Teach the lamb to nurse on its knees until it gets used to finding its own meals.

C. Caked udder. Strip regularly and apply hot packs. Keep the lamb nursing. Supplement the lamb when necessary.

D. Mastitis. Take the lamb away and supplement. Treat the ewe with antibiotics and sulfa, locally and intravenously. If milk flow comes back, put the lamb back on the ewe. Mark for sale at weaning.

E. Retained placenta or afterbirth. Do not manually remove.

VI. Grafting Lambs.

Two "fool-proof" methods.

A. Skin grafting

Skin "grafting" is the removal of the skin from the dead lamb and putting it on the lamb which is to be grafted.

Procedure:

1. Pen the ewe in the area where she lambed.
2. Allow her to mother the dead lamb.
3. Remove the dead lamb and skin. Do this as rapidly as possible. Skin the lamb just as you would skin a rabbit.
4. Put the skin on the lamb that is to be grafted.
5. Tie the lamb's legs so its quick movements will not frighten the foster mother.
6. Present the lamb butt-end first to the ewe. If afterbirth is available, smear some on the lamb's neck and head.
7. Keep the ewe and lamb in a confined area where they can be closely observed for three to five days.
8. Remove skin after three to five days.

B. Slime grafting.

Slime "grafting" is the covering of the lamb to be grafted with afterbirth from its foster mother. This is usually practiced when a ewe has had a difficult birth and is down.

Procedure:

1. Move rapidly. Don't let the ewe get up.
2. Take the lamb that is to be grafted and tie its legs.
3. Completely cover the lamb with the afterbirth and fluids from its foster mother.

4. Present the lamb to its foster mother in the spot where she lambed, preferably while she is still down.
5. Keep the ewe and lamb in a confined area where they can be closely observed for three to five days.

Don't try grafting a lamb onto a ewe which has another lamb of her own, even if the twin lamb's skin is available.

Lambing time is the most critical period in the sheep production year. Timely management practices applied during this period will result in more profits at market time.

If you are inexperienced or have doubts about your ability to cope with any of the above aspects of sheep husbandry, it it suggested you contact your veterinarian.

Reprinted from a Connecticut Extension Service publication by Dr. L. A. Malkus and Don Grant, University of Massachusetts.

Issued by the Cooperative Extension Service, E. Bruce MacDougall, Dean, in furtherance of the Acts of May 8 and June 30, 1914; United States Department of Agriculture and Massachusetts counties cooperating. The Cooperative Extension Service offers equal opportunity in programs and employment. *J2814:12/85-2500*